

# #11.1 Heat Stress Standard

## **Purpose**

The purpose of this procedure is to ensure that a safe and healthful working environment is maintained during hot and humid conditions. A measure of discomfort results from the combined effect of excessive humidity and high temperatures. Through temperature measurements, a Humidex can be determined and used to assess the degree of discomfort. The Humidex level will trigger certain management actions.

The organization has established a standard for heat stress prevention, considering guidelines from professional bodies such as ACGIH and OHSCO.

## **Scope**

This procedure applies to a; personnel in non-air conditioned areas who may be exposed to excessive heat.

This will be in effect between May 1<sup>st</sup> and September 30<sup>th</sup>.

## **Risk Assessment**

It is the responsibility of each location to perform and document an assessment to identify all risk factors in their workplace that could lead to heat stress. Consideration should be given to work shift structures, workforce age, legislative requirements, industry best practices, internal lost-time data, etc.

Once the assessment has been completed and the category for the level of work has been established (light, moderate or heavy physical activity) it is the responsibility of local management to determine whether the work environment is covered under Schedule “A” (light unacclimatized to moderate acclimatized) or Schedule “B” (moderate unacclimatized to heavy acclimatized).

## **Responsibilities**

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## **Supervisors:**

Check workers in order to detect any signs or symptoms of heat stroke. The symptoms, from mild to severe, can include :

- Skin rashes
- Muscle cramps
- Chills
- Stomach aches or headaches
- Dizziness, vertigo
- Unusual fatigue or general discomfort
- Confusion, incoherent speech
- Aggressiveness, weird behavior (as if on drugs)
- Loss of balance
- Loss of consciousness
- Death

*Immediately send the afflicted person to the First Aid Station so they can be evaluated by a first aid worker.*

Using a portable weather station, take measurements at various points and at various times during the day. (Each location affected to purchase meters) Start recording hourly temperature and relative humidity once the humidex exceeds 29 degrees celsius.

## **Management :**

Provide resources and equipment necessary for the proper implementation of the procedure.

Ensure workers' awareness.

## **Environmental Factors**

Four environmental factors affect the amount of stress a person faces in a hot environment:

- a. Air temperature
- b. Relative humidity
- c. Radiant heat (such as from the sun or a furnace)
- d. Air velocity

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The level of heat stress a person experiences is also related to personal characteristics such as age, weight, medical condition and acclimatization to the heat. Risk of injury may increase if an employee is:

1. chronically ill
2. over 40 years old
3. returning to work from vacation
4. overweight or in poor physical condition
5. on a severely restricted diet
6. recovering from a recent illness, including a heat related illness
7. dehydrated
8. living in high temperatures at night (no recovery time), or
9. experiencing a fever

Other personal factors that can increase a person's risk of heat stress include:

1. consumption of alcohol (within 24 hours)
2. consumption of caffeinated and sugary drinks
3. use of medications for:
  - a. high blood pressure
  - b. diuretics
  - c. antidepressants
  - d. tranquilizers
  - e. antihistamines (allergy and cold medications)
4. recent illnesses
5. recent vaccinations, or
6. skin trauma, including sunburn

Despite the condition mentioned above, employees may be able to cope given adequate knowledge of signs and symptoms of heat stress and if given the latitude to make the appropriate adjustments to their workplace or work routine. It is more often the young, fit workers who may think they are invincible who succumb to heat strain. Some workers may need medical advice about what accommodations would be right in their circumstances.

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Refer to Appendix “B” for the Health Effects of Heat Stress and Treatment

## Heat Stress Controls

### Mechanical

Mechanical controls are the most effective to protect workers from being exposed to extreme heat.

1. Fans made available at the work station
2. Ceiling fans where possible
3. Physical stress reduction for some tasks through the use of mechanical assists

### Administrative

Should mechanical controls be unusable (ie. working outside) or insufficient, administrative controls should be used to reduce the risk of heat stroke.

1. Schedule breaks as determined by the facility risk assessment. Follow the appropriate Appendix "A". These breaks should be taken in shady and cool areas, including inside an air conditioned lunchroom or office.
2. Ensure workers have access to drinking water. Workers must be strongly encouraged to drink small amounts of water frequently (one 250 ml glass every 20 minutes).
3. Make workers and supervisors aware of early signs of heat stroke and report them immediately.
4. Ensure first aid workers know how to treat a worker showing signs of a heat stroke.

## Measuring the Humidex in the Workplace

Temperature and relative humidity are measured at various points and various time throughout the day, in the plant. These measurements are then recorded on a specific board. (see Appendix “C”)

These measurements will determine which actions management should then take. It is the management's responsibility to implement those actions (see Appendix "A1/A2").

## Training and Awareness

- Review health effects of heat stress
- Appropriate clothing for high humidity
- Outdoor work in direct sunlight
- Review response plan

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## Work Categories

Below are some examples of physical activities that might be considered in each category.

Resting	<ul style="list-style-type: none"><li>• Sitting quietly</li><li>• Sitting with moderate arm movements</li></ul>
Light	<ul style="list-style-type: none"><li>• Sitting with moderate arm and leg movements</li><li>• Standing with light work at machine or bench while using mostly arms</li><li>• Using a table saw</li><li>• Standing with light or moderate work at machine or bench and some walking about</li></ul>
Moderate	<ul style="list-style-type: none"><li>• Scrubbing in a standing position</li><li>• Walking about with moderate lifting or pushing</li><li>• Walking on level at 6 km/hr while carrying a 3 kg weight load</li></ul>
Heavy	<ul style="list-style-type: none"><li>• Carpenter sawing by hand</li><li>• Shoveling dry sand</li><li>• Heavy assembly work on a non-continuous basis</li><li>• Intermittent heavy lifting with pushing or pulling e.g. pick and shovel work</li></ul>
Very Heavy Work	<ul style="list-style-type: none"><li>• Shoveling wet sand</li></ul>

*Acclimatized: Workers that have worked in the various heat levels for a week are considered acclimatized*

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## Appendix “A1” Light to Moderate Activity

(Light unacclimatized / moderate acclimatized)

HUMIDEX	ACTION
25-33°C	<ul style="list-style-type: none"> <li>➤ Ensure workers have access to fresh water.</li> <li>➤ At 30°C, watch more closely for signs and symptoms that workers can exhibit.</li> <li>➤ Encourage workers to advise their co-workers, supervisor and/or first aid worker, of any personal sign of symptom.</li> </ul>
34-39°C	<ul style="list-style-type: none"> <li>➤ Review heat response awareness at each morning tailgate meeting especially during a heat wave.</li> <li>➤ Start measuring the temperature and relative humidity, using the equipment available and the table in Appendix "C".</li> <li>➤ Encourage workers to drink water (250 ml every 20 minutes) and provide workers with drinking bottles if necessary.</li> <li>➤ Adjust the work pace accordingly to the humidity.</li> <li>➤ Set up stations with Gatorade or other refreshments that provide electrolytes.</li> <li>➤ Any non-essential hard work, delay to a later part of the day.</li> <li>➤ Pay particular attention to workers not acclimatized to hot weather (ie. just returning from a break).</li> <li>➤ Ensure employees do not work alone.</li> <li>➤ Add an extra 5 minute to the morning and afternoon break periods.</li> </ul>
40-44°C	<ul style="list-style-type: none"> <li>➤ In addition to the indications above at 34-39°C, give a 15 minute break period every hour. The breaks should be taken in the shade or in a cool place (ie. lunchroom).</li> <li>➤ If temperature stays at these levels for at least three days, consider extending the break time every hour. The same goes if the adjusted air temperature rises during the day.</li> <li>➤ Check regularly on the employees, looking for any signs, and reduce the work pace even more.</li> <li>➤ Drink water more frequently (ie. one 250 ml glass every 15 minutes). Workers should always have access to water. <i>Caution workers not to drink more than 1.5L every hour.</i></li> <li>➤ Continue to provide electrolyte drinks to prevent dehydration.</li> </ul>
45 + °C	<ul style="list-style-type: none"> <li>➤ In addition to all provisions listed above, when the temperature meets or exceeds 45+ all production related tasks are to be performed at 20 minutes work and 20 minutes break time.</li> <li>➤ All employees are to be monitored frequently for signs of heat exhaustion.</li> </ul>

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## Appendix “A2” Moderate to Heavy Physical Activity

(Moderate Unacclimatized and Heavy Acclimatized)

HUMIDEX	RESPONSE
25-29°C	<ul style="list-style-type: none"> <li>➤ Ensure workers have access to fresh water (drinking fountains)</li> </ul>
30-37°C	<ul style="list-style-type: none"> <li>➤ Post Heat Stress Alert notice;</li> <li>➤ Provide 10 minutes relief per hour with breaks taken in the shade or in a cool place. (ie. Lunchroom)</li> <li>➤ Notify workers that they workers to drink extra water;</li> <li>➤ Start recording hourly temperature and relative humidity</li> <li>➤ Set up stations with Gatorade or other refreshments that provide electrolytes.</li> <li>➤ Pay particular attention to workers not acclimatized to hot weather</li> <li>➤ Ensure workers are trained to recognize symptoms and do not work alone.</li> </ul>
38 – 42°C	<ul style="list-style-type: none"> <li>➤ Follow above with the addition of the following:</li> <li>➤ Provide 15 minutes relief per hour. The breaks should be taken in the shade or in a cool place (ie. Lunchroom)</li> <li>➤ Provide adequate cool (10-15°C) water</li> <li>➤ At least 1 cup (240 ml) of water every 20 minutes</li> <li>➤ If temperature stays at these levels for more that three days, consider extending break time every hour. The same goes if the adjusted air temperature rises during the day.</li> <li>➤ Workers with symptoms should seek medical attention</li> </ul>
42 – 45°C	<ul style="list-style-type: none"> <li>➤ Provide 30 minutes relief per hour in addition to provisions listed previously.</li> </ul>
45 + or over	<ul style="list-style-type: none"> <li>➤ In addition to all provisions listed above, when the temperature meets or exceeds 45+ all production related tasks are to be performed at 20 minutes work and 20 minutes break time.</li> <li>➤ All employees are to be monitored frequently for signs of heat exhaustion.</li> </ul>

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## Appendix B

### Health Effects of Heat Stress

Health Effect	Symptoms	Treatment
Heat Rash	Red bumpy rash with severe itching.	Change into dry clothes and avoid hot environments. Rinse skin with cool water. Wash regularly to keep skin clean and dry.
Fainting	Sudden fainting after at least two hours of work; cool moist skin; weak pulse.	<b>GET MEDICAL ATTENTION.</b> Assess need for CPR. Move to a cool area; loosen clothing; make person lie down; and if the person is conscious, offer sips of cool water. Fainting may also be due to other illnesses.
Heat Cramps	Heat cramps are painful, involuntary muscle spasms that usually occur during heavy exercise in hot environments. Inadequate fluid intake often contributes to this problem. The spasms may be more intense and more prolonged than typical nocturnal leg cramps. Muscles most often affected include the calves, arms, back and abdomen, although the cramps may involve any muscle group involved in the exercise.	<b>If you suspect heat cramps:</b> Rest briefly and cool down. Drink water or an electrolyte-containing sports drink. Practice gentle, range-of-motion stretching and gentle massage of the affected muscle group.
Heat Exhaustion	Signs and symptoms of heat exhaustion often begin suddenly, sometimes after excessive exercise, perspiration and inadequate fluid intake. Symptoms resemble shock and include: feeling faint, nausea, ashen appearance, rapid heartbeat, low blood pressure, hot, red, dry or sweaty skin, and low-grade fever, generally less than 40°C.	<b>If you suspect heat exhaustion:</b> Get the person out of the sun and into a shady or an air-conditioned location. Lay the person down and elevate the feet slightly. Loosen or remove the individuals clothing. Have the person drink cold water, not iced, or a sport drink containing electrolytes. Cool the person by spraying him/her with cool water and fanning. Monitor the person carefully. Heat exhaustion can quickly become heat stroke. <b>If fever – especially greater than 40 °C – fainting, confusion or seizures occur. CALL FOR EMERGENCY MEDICAL ASSISTANCE.</b>



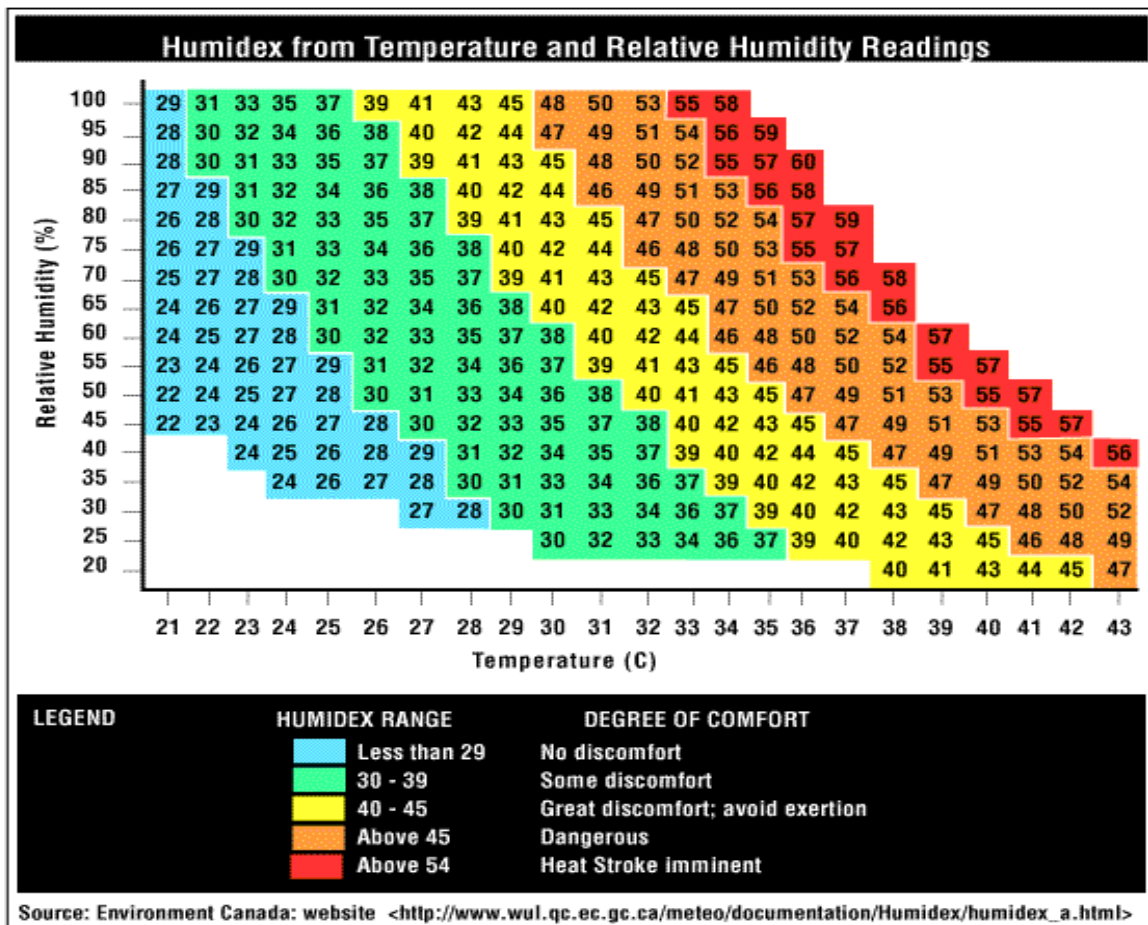
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Heat Stroke	The main sign of heatstroke is a markedly elevated temperature – generally 6 greater than 40°C – with hot, dry skin and changes in mental status ranging from personality changes to confusion and coma. Other signs may include: rapid heartbeat, rapid and shallow breathing, elevated or lowered blood pressure, cessation of sweating, irritability, confusion, or unconsciousness, fainting, which can be the first sign in older adults.	<b>If you suspect heatstroke:</b> Move the person out of the sun and into a shady or an air-conditioned space. <b>CALL FOR EMERGENCY MEDICAL ASSISTANCE.</b> Cool the person by covering him or her with damp sheets or by spraying with cool water. Direct air onto the person with a fan or newspaper.
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## APPENDIX “C”

### How is humidex interpreted?

If you know the temperature and relative humidity, the following chart can be used to determine the humidex rating. For example, if the temperature is 30°C and the relative



humidity is 70%, the humidex rating is 41 of “great discomfort”.